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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/708,932	11/08/2000	Salman Akram	3434.1US (97-856.1)	4170
24247	7590	09/27/2004	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			MACKEY, JAMES P	
			ART UNIT	PAPER NUMBER

1722

DATE MAILED: 09/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/708,932

Applicant(s)

AKRAM, SALMAN

Examiner

James Mackey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,6-20,23-31,34-37 and 39-42 is/are pending in the application.
- 4a) Of the above claim(s) 42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-11,16-20,23-31,34-37 and 41 is/are rejected.
- 7) ☒ Claim(s) 12-15,39 and 40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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1. Newly submitted claim 42 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Inventions of newly submitted claim 42 and of originally presented claims 1-3, 6-20, 23-31, 34-37 and 39-41 are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the mold substrate cavity is not required to have “a shape of one of a trapezoidal shape, a hemispherical shape, rectangular shape and a square shape”, nor is the mold substrate cavity layer required to be for “minimizing the wetting of solder paste on the at least one cavity” (note that claim 42 requires that the “first degree of wettability” of the mold substrate cavity layer be less than the “second degree of wettability” of a bond pad of a carrier substrate). The subcombination has separate utility such as for use in transferring solder balls to a carrier substrate positioned above the cavities formed on an upper surface of the mold substrate.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, **claim 42 is withdrawn from consideration** as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

2. Claim 23 is objected to because of the following informalities: claim 23 depends from cancelled claim 22, and should apparently depend from independent claim 18. Appropriate correction is required.

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3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-3, 6-11, 16-20, 23-31, 34-37 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ochiai et al. '831 in view of any one of Yeh et al., Cordes et al., Tsuji et al., MacKay et al. and Fallon et al., **for the reasons of record** as described in paragraph 5 of the previous Office Action (mailed 11 March 2004).

6. Claims 12-15, 39 and 40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Applicant's arguments filed 14 June 2004 have been fully considered but they are not persuasive.

Applicant's arguments regarding the claim rejection under 35 USC 112, second paragraph, are persuasive, and said rejection has been withdrawn.

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Applicant's arguments regarding the rejection of claims 12-15, 39 and 40 under 35 USC 103 are persuasive, and said rejection has been withdrawn.

Applicant argues that there is no motivation to modify or combine the teachings of the references because such would change the principle of operation of the invention of Ochiai et al., specifically the projection of the reflowed solder balls above the mold surface and the accurate positioning of the reflowed solder balls in the mold cavities; however, the Examiner disagrees. The prior art clearly recognizes that the solder ball (formed when the molded solder material is subsequently reflowed) should have a height greater than the mold cavity depth to facilitate transfer of the solder ball; see especially Yeh et al. (Figure 1b and col. 5, lines 9-13), MacKay et al. (col. 15, lines 58-65) and Cordes et al. (col. 4, lines 30-33). Moreover, the prior art clearly recognizes the importance of accurate positioning of the reflowed solder ball when seated within the mold cavity; see especially Yeh et al. (col. 5, lines 9-10). Thus, it would have been obvious to modify the mold cavity shape of Ochiai et al. '831 by utilizing the conventional solder mold cavity shapes disclosed in each of Yeh et al., Cordes et al., Tsuji et al., MacKay et al. and Fallon et al. without destroying the utility of the mold of Ochiai et al. '831.

Applicant argues that it would be "impossible to form the cavity shapes" of the secondary references in the mold of Ochiai et al. '831 "because the crystallographic plane that forms the surface in which the cavities are formed, together with the orientation of the mask relative to the surface, determines in large part the shape of the resulting cavity". However, such an argument is essentially arguing that the mold cavity shapes of the second reference cannot be bodily incorporated into the specific mold disclosed in Ochiai et al. '831, and the test for obviousness is not whether the features of one reference may be bodily incorporated into the other to produce

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the claimed subject matter, but simply what the combination of references makes obvious to one of ordinary skill in the pertinent art; see *In re Bozek*, 163 USPQ 545, *In re Henley*, 112 USPQ 56. The question in a rejection for obviousness on a combination of references is what the secondary reference would teach one skilled in the art and not whether its structure could be bodily substituted in the basic reference structure; see *In re Richman*, 165 USPQ 509. Proper inquiry regarding the test of obviousness should not be limited to the specific structure shown by the references, but should be into the concepts fairly contained therein, and the overriding question to be determined is whether those concepts would suggest to one skilled in the art the modifications called for by the claims; see *In re Van Beckum et al.*, 169 USPQ 47. Moreover, Ochiai et al. '831 explicitly disclose (col. 6, lines 24+) that the shape of the **mask** utilized in the **method of forming** the mold cavities determines, to a large extent, the shape of the mold cavities, and Ochiai et al. '831 also disclose that any etching technique (including sequential maskings, see Figs. 14A-14C) may be utilized (col. 7, lines 34-37); therefore, a skilled artisan, considering the totality of the disclosures of the applied prior art references, would have been motivated to modify the solder mold having a protective layer thereon, as disclosed in Ochiai et al. '831, with mold cavities of conventional shapes as suggested by any of the secondary references, recognizing that such cavity shapes may be formed, for example, by etching utilizing an appropriately-shaped mask. Furthermore, it should also be noted that the prior art recognizes that conventional solder mold cavity shapes may be formed by etching of silicon along a particular crystallographic plane (see Yeh et al. at col. 4, lines 8-12), but also note that none of the instant claims require the mold to be formed along a crystallographic plane.

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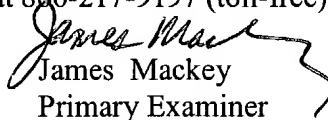
8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mackey whose telephone number is 571-272-1135. The examiner can normally be reached on M-F, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


James Mackey
Primary Examiner
Art Unit 1722

9/22/04

jpm
September 22, 2004